

# ROLE OF MAGNESIUM SULPHATE IN HYPERTENSIVE DISORDERS OF PREGNANCY

Razia Mustafa Abbasi and Pushpa Sirichand

## ABSTRACT

**OBJECTIVE:** To see the efficacy of Magnesium sulphate in preventing and controlling fits in hypertensive disorders of pregnancy.

**DESIGN:** Descriptive Study.

**SETTING:** Department of Gynaecology and Obstetrics, Liaquat University Hospital Hyderabad from January to December 2002.

**PATIENTS AND METHODS:** Thirty one patients having severe hypertension (Systolic BP  $\geq 160$  and Diastolic  $\geq 110$  mmHg) with or without proteinuria and fits were studied. Diagnosis was made through history, clinical findings and relevant investigations. Immediate management consisted of maintenance of intravenous line, clearance of airway and anti hypertensive medications for prevention and control of fits after excluding contraindications for magnesium sulphate therapy. All patients received Magnesium sulphate according to protocol. Occurrence and recurrence of fits, control of BP, side effects of magnesium sulphate, mode of delivery, maternal and fetal outcome were noted.

**RESULTS:** Total 91 patients were diagnosed with blood pressure 140/100 mmHg or above having severe pregnancy induced hypertension (PIH), pre-eclampsia and eclampsia during study duration. Out of these, 31 patients met criteria for magnesium sulphate therapy. Age range of patients was 16-35 years. Only 7 cases were booked and all eclamptic patients were referred cases. Majority of women was nullipara. Gestational age at admission was more than 35 weeks in 20 patients (64.51%). Twenty six women (83.87%) had blood pressure at admission  $> 160/110$  mmHg. Fits were effectively controlled in eclamptic patients and none of the patients with pre-eclampsia and PIH developed fits who received magnesium sulphate. Fetal outcome was good in those who came at term with alive fetus and delivered by caesarean section. Nineteen (61.29%) fetus were alive, 8 were delivered still birth and 4 died during neonatal period. Only one patient had respiratory depression. There was no maternal death.

**CONCLUSION:** Magnesium sulphate can be safely and effectively used for the prevention and control of fits in hypertensive disorders of pregnancy.

**KEY WORDS:** *Pregnancy. Hypertension. Eclampsia. Magnesium Sulphate.*

## INTRODUCTION

The most common pregnancy related conditions leading to admission at a tertiary care unit are severe hypertension, pre-eclampsia and eclampsia<sup>1</sup>. Sub standard care can be implicated for 80% of maternal deaths in hypertensive disease<sup>2</sup>. Pre-eclampsia and eclampsia are major causes of maternal and fetal morbidity and mortality world wide, but particularly in the developing countries because of unawareness, non-availability and improper representation by health care providers<sup>3</sup>. Various anticonvulsant agents such as phenobarbitone diazepam and phenytoin have been used in the management of eclampsia, but rarely in cases of severe hypertension and pre-eclampsia.

Chesley first introduced magnesium sulphate for the control of convulsions<sup>4</sup>. Large randomized trials in developing countries and systematic reviews have shown the usefulness of magnesium sulphate in treating recurrent eclamptic seizures and in the prophylaxis of eclampsia. Despite this evidence, magnesium sulphate remained underused<sup>5</sup>.

Magnesium sulphate is a drug of choice for seizure prevention. It prevents fits by selectively dilating the cerebral vasculature and relieving the cerebral vasospasm associated with pre-eclampsia<sup>6,7</sup>.

The use of magnesium sulphate is now regarded as first line therapy for the hypertension, however, it should not be given if the patient has hyperkalemia as it may exacerbate cardiac arrhythmias and precipitate

ventricular fibrillation by antagonizing the membrane stabilizing effects of calcium.

This study was carried out to see the efficacy and safety of magnesium sulphate for the prevention and control of convulsions in patients with severe pregnancy induced hypertension, pre-eclampsia and eclampsia.

## PATIENTS AND METHODS

This descriptive study was conducted at department of Gynaecology and Obstetrics, Liaquat University Hospital, Hyderabad, Sindh from January to December 2002. Total obstetric admissions during one year period were 1020. Out of these, 850 women delivered in labour ward of Gynaecology Unit-III of the Department. Total 91 patients were diagnosed with severe pregnancy induced hypertension with or without proteinuria, pre-eclampsia and eclampsia. Out of these, 31 patients met the criteria for magnesium sulphate therapy. All 31 patients who presented with severe hypertension (BP>160/110mmHg) with or without proteinuria, eclampsia (antepartum, intrapartum and postpartum) were included.

Diagnosis was made on history of gestational amenorrhea, severe headache, epigastric / upper right quadrant pain, vomiting, fits, elevated blood pressure and presence of proteinuria on heat coagulation test. Necessary investigations such as blood complete picture with platelet count, haematocrit level, coagulation profile, renal, liver function tests and serum electrolytes were done.

Immediate management consisted of maintenance of intravenous line, clearance of airway, anti hypertensive therapy for prevention and control of fits. Patients with respiratory rate <16/m, cyanosis or urinary output <30/ml/h were excluded from the study. Magnesium sulphate was given as bolus dose of five grams (20ml of 20% solution was administered within 15 to 20 minutes) followed by maintenance dose of 1 gram per hour and 5 grams diluted in 500 ml of 5% dextrose water were given as 100 ml per hour at the rate of 100 micro drops per minute. Infusion continued for 24 hours after the last fit. Monitoring was done by hourly recording of respiratory rate, urine output and patellar reflexes. Estimation of magnesium levels could not be performed because such facility was not available in our institution at the time of study. For the control of blood pressure, Aldomet (Methyldopa) was used as the drug of choice. Calcium channel blocker (Adalat) was used as adjuvant therapy to control blood pressure or when patient was having convulsions. Patients condition was monitored by assessing the level of consciousness, blood pressure, pulse and respiratory rates, urinary output, auscultating lung bases and

eliciting knee jerk. After delivery, patient was discharged with advise of home monitoring of blood pressure. Neonatal care was provided by neonatologist. Patients were advised regarding contraception, need for regular antenatal check up and hospital delivery in next pregnancy.

## RESULTS

Age range of patients was 16-35 years. Out of 31 who presented with severe PIH, 12 women (38%) were between 21 – 25 age group and 4 (12.90%) were less than 20 years. Youngest patient was of 16 years (**Table I**). Eighteen women (58.06%) were nullipara while remaining were multipara (**Table II**). Out of 31, only 7 were booked patients and all eclamptics were referred cases.

Gestational age at admission was more than 35 weeks in 20 patients (64.51%). Twenty six women (83.87%) had blood pressure at admission > 160/110 mmHg, and 5 patients had blood pressure more than 180/120 mmHg (**Table III**). Fits were effectively controlled in eclamptic patients. None of patients with pre-eclampsia and PIH developed fits who received magnesium sulphate. Recurrence of convulsions was low (**Table IV**). Twelve eclamptic patients had fits prior to admission ranging from 1 to 5. None of the patient developed fits after 36 hours of initiation of therapy. Rate of vaginal delivery was more as compared to caesarean section (**Figure I**).

Out of 31, 11 patients needed induction / augmentation. Of these 11 patients, 06 had induction and in 5 augmentation of labour was done. Fetal outcome was good in those who came at term with alive fetus and delivered by caesarean section. Nineteen (61.29%) fetus were alive, 8 delivered still birth and 4 died during neonatal period. Only one patient developed respiratory failure, which was immediately diagnosed and managed by intravenous administration of calcium gluconate. Two patients had postpartum haemorrhage. There was no maternal death.

**TABLE I:**  
**AGE DISTRIBUTION OF PATIENTS**  
(n=31)

Age (In years)	No. of Patients	Percentage
< 20	04	12.9
21-25	12	38
26-30	10	32.25
31-35	05	16.21



**TABLE II:  
PARITY STATUS OF PATIENTS**

Parity	No. of Patients	Percentage
Primigravida	18	58.06
1-2	05	16.12
3-4	03	9.67
> 4	05	16.12

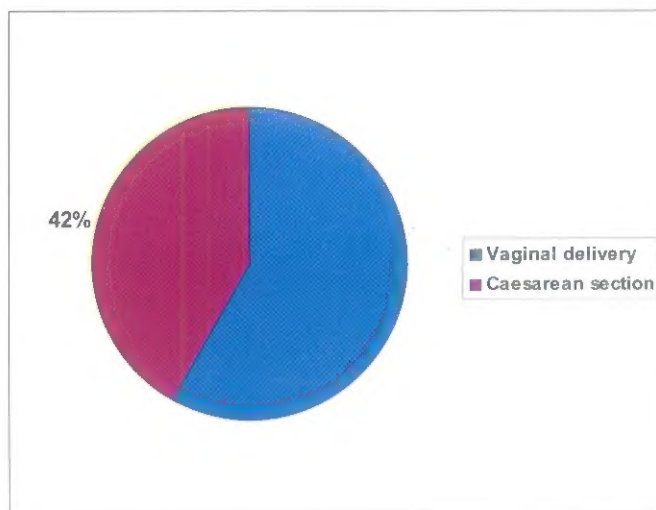
**TABLE III:  
BLOOD PRESSURE OF PATIENTS  
AT TIME OF ADMISSION**

Blood Pressure	No. of Patients	Percentage
$\geq 160/110$	26	83.87
$\geq 180/120$	05	16.12

**TABLE IV:  
DURATION OF ANTI CONVULSANT TREATMENT  
AND ITS EFFECTS**

FITS CONTROLLED (n=12)	NO. OF PATIENTS WITH PERCENTAGE	MEAN TIME IN HOURS
< 12 hours	08 (25.8)	10
12-24 hours	02 (6.45)	18
24-36 hours	02 (6.45)	28
Prevention of fits	19 (61.2)	-
<b>BLOOD PRESSURE CONTROL</b>		
< 12 hours	21 (67.74)	10
12-24 hours	06 (19.35)	18
24-36 hours	05 (16.12)	28
<b>ADMISSION TO DELIVERY INTERVAL</b>		
< 12 hours	25 (80.64)	8
12-24 hours	06 (19.35)	14

**FIGURE I:  
MODE OF DELIVERY AMONG  
PATIENTS**



## DISCUSSION

Hypertension is early manifestation of an underlying multifactorial, multisystem disorder initiated early in pregnancy and pre-eclampsia and eclampsia are late manifestations. Both pre-eclampsia and eclampsia are associated with increased maternal and perinatal morbidity and mortality than hypertension alone, therefore, effective medical treatment is necessary<sup>8</sup>. In Pakistan, PIH is one of the major cause of maternal and perinatal morbidity and mortality because of lack of antenatal care, poor socio-economic conditions, illiteracy and inaccessibility to health care services.

This study was designed to see the effects of anticonvulsant agent; magnesium sulphate in preventing and controlling convulsions in hypertensive disorders of pregnancy such as PIH, pre-eclampsia and eclampsia. Though sample size was small but results have shown that magnesium sulphate is effective drug to be used as anticonvulsant for prevention and treatment of fits. Similar results have been shown by Robert et al<sup>5</sup>. Incidence of pre-eclampsia and eclampsia was high in young primigravida (58%) as compared to multigravida women. In primigravida, the common age group in our study was between 21-29 years. But, Hansen<sup>9</sup> had found 2-3 fold increase in the incidence of pre-eclampsia in nullipara over 30 years as compared with those between 21-29 years.

In our study, mean time for controlling fits was 10 hours as compared to 8.50 hours noted by Shamsuddin et al in Bangladesh. Criteria for delivery by caesarean section in patients with severe

hypertension was live fetus, poor Bishop score or when there was any other contraindication for vaginal delivery. Same criteria was adopted by Abbasi et al at Abbottabad<sup>10</sup>. Vaginal delivery was our aim as compared to abdominal in most of the women in our study. Study done at Karachi has also shown rate of vaginal delivery more as compared to caesarean section<sup>11</sup>. The duration from admission to delivery, recurrence of convulsions, perinatal morbidity and mortality of our study are also comparable with findings of a study from Harare<sup>12</sup>.

## CONCLUSION

This study concludes that magnesium sulphate can be safely and effectively used for the prevention and recurrence of convulsions (PIH, pre-eclampsia and eclampsia) but needs careful and continuous monitoring.

## REFERENCES

1. Evan Everest. Pre-eclampsia: pathophysiology and intensive care management. Adelaide. (Paper 41), pp. 1 - 11.
2. Department of Health 1996 report of confidential inquiries into maternal deaths in United Kingdom in 1991-1993 HMSO, London.
3. Torr GJ and James MFM. The role of anaesthetist in management of pre-eclampsia. Practical Procedures 1998; 9: 1-3.
4. Chesley LC. Hypertensive disorders in pregnancy. New York Appleton Century-Crofts 1978: 225-30.
5. Editorials. Preventing and treating eclamptic seizures. Br Med J 2002; 325: 609-610.
6. Belfoul MA, Moisc KJ. Effect of Magnesium Sulphate on maternal brain blood flow in pre-eclampsia: a randomized, placebo-controlled study. Am J Obstet Gynecol 1992; 167: 661.
7. Naidu S, Payne AJ, Medley J et al. Randomized study assessing the effect of phenytoin and magnesium sulphate on maternal cerebral circulations in eclampsia using transcranial doppler ultrasound. Br J Obstet Gynaecol 1996; 103: 111.
8. Bolte AC, vanGeijn HP, Dekker GA. Management and monitoring of severe pre-eclampsia. Eur J Obstet Gynecol Reprod Biol 2001; 96 (2): 168-72.
9. Hansen JP. Older maternal age and pregnancy outcome: a review of the literature Obstet Gynaecol Surg 1986; 41: 726.
10. Abbasi AN, Begum N, Hussain M et al. Early delivery by C-Section in eclampsia can reduce maternal and fetal morbidity and mortality. J Coll Physicians Surg Pak 1995; 4.
11. Khan A, Soomro N. Eclampsia: an aggressive approach is needed. Medical Channel 1998; 3 (4): 13-17.
12. The Eclampsia Trial Collaborative Group. Which anti convulsant for women with eclampsia? evidence from the collaborative eclampsia trial. Lancet 1995; 345: 1455-62.



### AUTHOR AFFILIATION:

**Dr. Razia Mustafa Abbasi** (*Corresponding Author*)

Assistant Professor, Department of Gynaecology and Obstetrics

Liaquat University of Medical and Health Sciences, Jamshoro, Sindh, Pakistan

**Professor Pushpa Sirichand**

Department of Gynaecology and Obstetrics

Liaquat University of Medical and Health Sciences, Jamshoro, Sindh, Pakistan